AIRBAG ARRANGEMENT FOR PROTECTION IN A FAR-SIDE VEHICULAR CRASH

INTRODUCTION

[0001] Airbags are used in vehicles to protect vehicle occupants in a crash. Typically, the airbags are placed in various locations around the vehicle, for example, in a steering wheel or in front of a front seat passenger. Other airbags may be placed in other locations in the vehicle, such as side curtain airbags that are placed along a vehicle ceiling and drop down along a window or door. Airbags are activated following a crash when a sensor in the vehicle detects a change in a rate of speed of the vehicle, an impact of the vehicle, or a combination thereof. In some vehicles, the sensor is capable of detecting a crash type and location, and will initiate deployment of suitable airbags to protect occupants in the vehicle. In some vehicles, for example, those with captain seats or having a space between two adjacent seats, there may be a gap between the seats where there is space for excessive movement of a person in the vehicle in the event of a crash. Providing additional support and protection in the center space may improve outcomes for passengers involved in a crash, particularly, a far-side crash.

SUMMARY OF THE DISCLOSURE

[0002] An arrangement of a pair of airbags is described herein to improve safety for occupants of a vehicle involved in a far-side crash. A pair of airbags may be deployed to fill an interior space in a vehicle to support persons in a vehicle that is involved in a side crash, particularly, a person facing a far-side crash. In general, an airbag inflating into an open space, such as an empty interior space, may have supportive limitations because the airbag may not be braced by a physical structure and can lack a reactive surface. The pairs of airbags described herein may be deployed in a number of shapes and arrangements and be used in different vehicle interior designs, such as those having particular pillar designs, instrument panel shapes, seat designs and other configurations, in an interior space between vehicle seats where a single airbag may be insufficient for supporting and protecting a vehicle occupant.

[0003] In an example, the airbag arrangement may include a first airbag that is disposed on a right side of a seatback of a first seat in the vehicle and a second airbag that is disposed on a left side of a seatback of a second seat in the vehicle. The two seats are located adjacent to each other for two occupants or persons in a vehicle. For example, the two seats can be a set of front row seats for a driver and a passenger, or a second row of seats for two passengers. The second seat in the vehicle is disposed on the right side of the first seat. The first airbag and the second airbag are configured to deploy at least partially into space between the first seat and the second seat when the vehicle is involved in a far-side crash. The first airbag and the second airbag are configured to act together to support a side of the passenger or driver facing the far-side crash. In some scenarios, the first airbag and the second air bag are configured to act together to support a side of the vehicle occupant on a near side of the crash so that person is contained from the other person facing the far-side crash.

[0004] Deployment of the pair of airbags may be initiated by an airbag detonator that is configured to be controlled by an airbag controller that has detected a crash scenario. The airbag controller may receive signals from one or more vehicle crash sensors to determine whether a far-side crash has occurred. When the airbag controller detects that such a crash has occurred, the airbag controller may initiate deployment of airbags in the vehicle. The airbag arrangement of the first airbag and the second airbag are configured to be deployed substantially concurrently.

[0005] The vehicle crash sensor may be configured to detect a crash involving the vehicle and initiate activation of the airbag by sending the crash sensor information to an airbag controller which may signal the airbags to deploy. The airbags may be deployed using, for example, a signal sent to an airbag switch, initiator, ignitor, or other starting device used to initiate inflation of the first airbag and the second airbag. When the vehicle crash sensor senses a far-side crash in the vehicle, the vehicle crash sensor is configured to send one or more signals to the airbag controller to initiate deployment of the first airbag and the second airbag.

[0006] The airbag arrangement of the first airbag and the second airbag may be configured to provide reciprocal support to each other when the airbag pair are deployed. The reciprocal support may be provided using a wedging effect of the two airbags between the two adjacent seatbacks. The two airbags can be supplied using suitable shapes, and fabrics having suitable friction and stiffness qualities, and a combination thereof to provide the reciprocal support.

[0007] The airbag arrangement may comprise a pair of shaped airbags. The airbag shapes may be symmetrical or asymmetrical. In some scenarios, the first airbag and the second airbag are complementary shaped pairs having a nested convex and concave shape, respectively. The nested or complementary shapes may be located at a portion of each airbag that is in contact with the other of the pair of airbags. The nesting of the shapes may allow the airbags to wedge together and limit slipping to provide mutual support between the two airbags.

[0008] The airbag arrangement may be adapted to deploy into a space between a first seat and second seat when the first seat and second seat are not aligned in the same fore/aft position. When the first seat is configured to have an adjustable first position and the second seat is configured to have an adjustable second position, and when the first position and the second position are different along at least one axis, such as a fore/aft axis, a vertical axis, a straight/reclined axis, or other positional axis in the vehicle, the first airbag and the second airbag are adapted to deploy such that one side of the first airbag facing a second side of the second airbag are substantially overlapping. Such deployment may substantially fill a space between the first seat and the second seat despite an irregularity in the space due to the different positioning of the first seat and the second seat. In some scenarios, rotation and placement of the airbags in an irregular space may occur by timing deployment of the airbags, and also by wedging each airbag against the other and also the seatbacks.

[0009] The airbags in the airbag arrangement may be designed to have certain characteristics that allow the pair of airbags to wedge together and to provide support for vehicle occupants. Materials selected for the airbags may be selected so that a first surface of a first airbag has a friction coefficient selected to provide a frictional force between the first surface of the first airbag and a second surface of the second